

ABSTRACT

In a 3D free space micromirror device, a mirror plate is joined with actuators through flexible springs where the other ends of the actuators have fixed support on the substrate. Single crystal silicon and aluminum are used as bi-morph materials with silicon dioxide providing electrical isolation between the two. Thickness variation in the microstructure is achieved by two-step p-n junction formed in a p-type substrate. Thick and thin n-silicon layer formation and DRIE cut mechanisms are employed in such a way that all the thick and thin silicon components of the structure are released simultaneously avoiding overetch which can be detrimental to the thin flexural springs. Working prototypes of the device have been found suitable for any optical switching array architecture where deflections up to 10 degrees are required.